Patent claims

1.　Method of communicating charging information (CI) in a network comprising at least a serving node (SGSN) and a gateway node (GGSN) wherein
5　　　charging information (CI) relating to a particular PDP context for a given mobile station is gathered in the gateway node and transmitted in a GTP header extension to a serving node (SGSN).

2.　Method according to claim 1, wherein the charging information (CI) at reception at
10　　　the serving node (SGSN) is signalled to a charging node (SCP) associated with the serving node (SGSN).

3.　Method according to claim 2, wherein the charging information (CI) is at least gathered by performing packet inspection of the transmitted packet and assigning a
15　　　predefined service class to the packet.

4.　Method according to claim 2, wherein the charging node signalled to is a CAMEL SCP node and the charging information is reported by means of the CAP protocol.

20　5.　Method according to any previous claim, wherein the network is a GPRS network, the serving node is Serving GPRS Support Node (SGSN), and the gateway node is a Gateway GPRS Support Node (GGSN).

6.　A packet data unit comprising
25　　　a header, at least one extension header and a payload, wherein the header comprises a next extension header type indicating that a predetermined service class extension header follows that is reserved for comprising service class information pertaining to at least one IP packet payload for a given PDP context for a user.
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7.　Packet data unit according to claim 6, wherein the service class information at least relates to the service class of the payload carried by the packet data unit comprising the service class extension header.

35　8.　Packet data unit according to claim 7, wherein the service class extension header moreover comprises a volume count pertaining to the amount of payload being

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transmitted in the same packet data unit carrying the service class extension header and belonging to a given PDP context.

5   9.   Packet data unit according to claim 6, wherein the service class information relates to the service class of the payload of IP packets transmitted in other packet data units relating to the same PDP context and wherein the volume count relates to the aggregate volume of the given classified payload.

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10.   Packet data unit according to claim 9, wherein the payload data relates both to data transmitted upstream and downstream for a given mobile user for a given a PDP context.

15   11.   Packet data unit according to claim 9, wherein at least two service class extension headers are comprised in the packet data unit, whereby the service class extension headers relates to different service classes.

12.   Packet data unit according to any of claims 6 – 11, wherein the packet data unit is
20   a GTP-U PDU packet and the payload is a GTP-U PDU payload.

13.   The packet data unit according to any of claims 6 - 11, wherein the extension header comprises at least a main service class field and a sub-class field.
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14. A gateway node (GGSN) communicating with a packet inspection and service classification system (PISC) to which IP packets may be communicated for identi-fication of a given service class out of a number of predetermined service classes, the gateway node (GGSN) performing the steps of

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receiving an IP packet (1I) from a packet data network (PDN, Gi),

extracting the IP packet payload,

10   receiving (3I) a service class value for the payload,

assigning the identified service class identity to a service class extension header (4I),

15   inserting the extension header (5I) to a packet data packet unit (GTP-PDU) carry-ing the payload (2I) and transmitting the packet data unit to a serving node (SGSN, Gn).

20 15. A serving node (SGSN) communicating with a charging node (CAMEL-SCP), the serving node (SGSN) performing at least the following steps

receiving a packet data unit (GTP-U) from a gateway node (GGSN, Gn) compris-ing a service class extension header (1II),

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extracting a service class value (2'II) from the service class extension header,

calculating and storing the volume count from the extension header for the re-ported service class for a given PDP context (3'II),

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transmitting the PDP payload towards a mobile station,

reporting (4II, 5II) associated values of service class and volume count to a charg-ing node (CAMEL-SCP).

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16. A serving node (SGSN) communicating with a charging node (CAMEL-SCP), the serving node (SGSN) performing at least the following steps

receiving (1II) a packet data unit (GTP-U) from a gateway node (GGSN, Gn) comprising a service class extension header,

extracting (2II) a service class value and volume count from the service class extension header,

storing (3II) the volume count from the extension header for the reported service class for a given PDP context,

transmitting the PDP payload towards a mobile station,

reporting (4II, 5II) associated values of service class and volume count to a charging node (CAMEL-SCP).

17. Serving node according to claim 15 or 16, wherein the storing (3'II, 3II) of the volume count involves accumulating a volume counter pertaining to a given PDP context.

18. Serving node according to claim 15 or 16, wherein the charging node is a CAMEL node and the reporting hereto is following CAMEL reporting procedures.

19. Serving node according to claim 15 or 16, wherein the accumulation of volume reports from classified and / or incompletely classified payload volume are maintained as long as the PDP Context is active.

20.   A gateway node (GGSN) communicating with a packet inspection and service
       classification system (PISC) to which payload of IP packets may be communicated
       for identification of a given service class out of a number of predetermined service
       classes, the gateway node (GGSN) performing the steps of

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       continuously receiving (1III) downstream IP packets from a packet data network
       (PDN, Gi) interface for a given PDP context,

       continuously receiving (2III, 3III) service class identification for the IP packets,

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       for those IP packets, which are incompletely classified (3III), transmitting the pay-
       load (5III) towards a serving node (SGSN), while storing (4III) the volume count
       and associated incomplete classification for a given PDP context,

15   when being able to identify (8III) a service class for a payload belonging to a PDP
       context for which payloads were previously incompletely classified, assigning the
       identified service class (9III) and the aggregate volume count (10III) for the previ-
       ously incompletely classified payloads of the same PDP context to a service class
       extension header,

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       inserting (11III) the extension header to a packet data packet unit (GTP-PDU) car-
       rying the payload and transmitting the packet data unit to a serving node (SGSN,
       Gn).

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21. A gateway node (GGSN) communicating with a packet inspection and service classification system (PISC) to which payload of IP packets may be communicated for identification of a given service class out of a number of predetermined service classes, the gateway node (GGSN) performing the steps of

continuously receiving (1IV) upstream packet data units to a serving node (SGSN, Gn) relating to a given PDP context,

receiving (3IV) the service class for the upstream payload,

storing or accumulating (4IV) uplink volume count per service class,

when receiving (6IV) a first downstream packet from a packet data network (PDN, Gi) relating to the same PDP context,

receiving (8IV) the service class for the downstream payload,

preparing (10IV) a service class header with the given service class for the upstream payload and the saved or accumulated volume counts,

preparing (12IV) a service class header with the given service class for the downstream payload and the corresponding volume count,

inserting (11IV, 13IV) the extension headers to a packet data packet unit (GTP-PDU) carrying the payload (7IV) and transmitting it to a serving node (SGSN, Gn).